STATE OF IDAHO

STATE DEPARTMENT OF EDUCATION – Wireless Requirements Policy

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Purpose - The Idaho State Department of Education (SDE) is publishing the requirements for Idaho School Districts that are seeking to opt-out of the Idaho High School Wireless Managed Service and install their own wireless program. To ensure that all Idaho students in grades 9-12 as well as administrators, instructors, technology staff and other staff members of schools serving any grades 9-12 have full, connectivity via the wireless technology solution.

Overview – Idaho High School Wireless Project (Project):

This section is provided as a general overview of the original Project and does not modify the more specific sections that follow and are contained within this policy.

The Project is a result of legislation that was originally passed by the Idaho Legislature in 2013. Senate Bill 1200 appropriated one-time funding as part of the Public Schools Budget. In 2014, JFAC approved appropriations for one more year of one-time funding for the Project. The 2014 appropriation provided for more flexibility, allowing for schools to opt-out of the Statewide contract and procure their own wireless solution if they so choose. By meeting the requirements outlined in this document, districts that opt-out of the Statewide contract will be eligible to receive $21 per student in grades 9-12. Districts that prefer to continue with the Statewide contract may do so. The Project will provide every public school serving any grades 9-12 (High School) in the state of Idaho with full wireless technology coverage throughout the High School and extending beyond the actual school building as specified in this policy. The Project will support educating more students at a higher level by providing electronic network connectivity throughout the entire school building rather than only in a wired classroom. Regardless of the student's demographical location, they will have access to the best educational opportunities, including the highest quality instruction and highly effective teachers. Every student will learn in a 21st Century classroom not limited by walls, bell schedules, school calendars, or geography. When they graduate from high school, they will be prepared to go on to post-secondary education or the workforce, without the need for remediation. The project is supporting the recommendations from the Governor's Education Task Force that was formed in 2013.

High School administration, educational staff and students will have access to wireless electronic network connectivity and the associated support. The school's leadership is tasked with ensuring that every administrator, student and teacher has immediate and reliable access to utilize computing technology and the Internet throughout the school day and that the computing devices utilized by each individual school will have connectivity throughout the school building.

Services Provided By Other Entities

Connectivity and adequate bandwidth to each high school building – The State's existing Idaho Education Network (IEN) administered by the Idaho Department of Administration, ensures connectivity and Internet service to every school district's wide area network (WAN) internet aggregation point. The responsibility for distributing the IEN provided bandwidth to each building across the district WAN is the responsibility of the district. The amount of bandwidth provided to each district ensures that a reasonable, adequate bandwidth is available to each participating high school building. An IEN eligible high school is a high school with a 12th grade and is authorized by the

State to graduate students. There are schools that are eligible for wireless managed services under this Project that are not currently receiving IEN provided services. All districts currently intending to participate in this Project must have 3 Mbps-equivalent or better connections from IEN or another ISP of their choosing. Additional information about the IEN is included on the web at http://www.ien.idaho.gov.

IEN Services - The IEN provides statewide services to schools, including advice and consultation on configurations, network environments and optimization of school connections. Some technical support is also available for schools that need onsite technical advice and assistance, but this is not the IEN's focus.

Participation by Schools - All Idaho high schools are eligible to participate in the Project (this Project includes 9th grade students enrolled in a state-funded "Junior High School"). It is estimated that over two hundred Idaho schools enroll high-school-age students. Many of these schools are small and rural. Since Idaho is a "local control" state, each of Idaho's local school units, organized on a municipal or regional basis, has a locally elected school board with general statutory responsibility for policy and operational oversight of each school.

Connectivity - The devices utilized by educators and students in the individual schools, whether it is a "Bring Your Own Device" (BYOD) model or a classroom supplied device, must be able to connect to the wireless network, the school's pre-existing local network, and the Internet either directly through the Idaho Education Network (IEN) or the local ISP, wirelessly. and must not conflict with existing connectivity.

Network Connectivity and Infrastructure - The wireless network infrastructure shall connect from the proposed solution hardware at one end to the IEN or the school's provided internet demarcation at the other end. Between the two ends, the solution must include switches as needed, the placement of access points, server capacity for applications/files, and any other components necessary to complete the solution. To minimize the need to perform local electrical upgrades, Power-over-Ethernet (POE) is preferred. Connectivity should include but not be limited to physical cable from the closest data to the access point. Cabling and other equipment must meet the minimum requirements outlined below. Fiber connectivity is recommended between the IDF and the MDF. The existing network hardware, servers and infrastructure may be utilized by the solution at the district's discretion. The in-school infrastructure shall be accessible wirelessly. All participating schools have 3 Mbps-equivalent or better Internet connections provided by the IEN or an ISP of the local school unit's choice.

Wireless Coverage - The solution must ensure coverage such that there is sufficient capacity to connect all devices to the school's network from any instructional and administrative area of the school. Students and educators will experience transparent roaming connectivity to the school's wireless LAN as they move among the various rooms and areas in the school building. The solution must include access to all high school instructional areas as well as all administrative areas including, at a minimum, academic classrooms for all content areas, frequently used study areas, media centers, assembly spaces, the library and administrative offices. It is understood that the specification listed above is not required for areas such as the cafeteria and gym at certain times. This requirement does not include the necessity to provide coverage for

events such as sporting, assemblies or other all-inclusive events (e.g. the football stadium or auditoriums). The solution must provide for a site survey to be performed in order to optimize each school's coverage area.

The wireless solution must provide complete mobility for both district-owned and district-sanctioned hardware. While at a school, wireless users must be able to experience transparent roaming connectivity to the wireless network throughout the school. The wireless users should be able to travel between schools and seamlessly connect when moving from school to school (ex. same SSID so that reconfiguration is not needed when moving between schools).

The wireless solution will provide the ability for districts to view reports, get real-time statistics, and engage in limited management of the service via a single interface.

In order to meet these requirements, the solution must, at a minimum:

- Provide 802.11X coverage at a minimum a/b/g/n (and ac/ad when available to work with systems within the school/building/site). We expect the newest ratified standards to be utilized at the time of hardware purchase with periodic upgrades to the most current standards on a rotational basis once every 60 months or sooner as deemed necessary. The district's will have up to 24 months from April 1, 2014 to purchase and install 802.11n equipment based on the individual districts' needs and requirements;

- Provide both 2.4Ghz and 5Ghz wireless service;

- Provide a minimum of -70dbm as measured on the 2.4Ghz spectrum to all areas where service is required, per the specifications listed above;

- Provide load balancing/ band steering (band steering to automatically serve both 5Ghz capable clients and maximizing the capacity in the 2.4Ghz range) to ensure optimal distribution both up and down of clients on the 2.4Ghz and 5Ghz spectrum;

- Provide cabling that is rated no lower than cat 5e (preferred cat 6) to allow copper connectivity at 1000Mb or 1Gb;

- Patch panel will match the district's network cable specification or better;

- The copper cable will not run a distance longer than 100 Meters to be within the IEEE Specification for copper Ethernet.

- The access point will be labeled and matching label will be placed on the patch panel for identification. A patch cable will be placed from the patch panel to the network switch. Example if the cable is cat 5e the patch panel will be cat 5e or better if the cable is cat 6 the patch panel will be cat 6 or better;

- Provide multiple user profiles and access levels within a single wireless SSID, as such topologies will be required by certain schools;

- At a minimum, provide quarterly per district and per school wireless utilization reporting to the SDE, including total connected users, users per spectrum, and users per SSID;

- Provide a graphical layout of signal strength to the SDE throughout the network at each school;

Wireless Access - The devices will access the wireless solution, which will include the network, switch, servers, and access points and associated hardware to provide a robust network environment for student and educator network connection requirements. The solution should provide and deploy a POE switch or switches, sized for the school's needs, based on site analysis approved by the SDE. Districts must define all areas at each site that are designated as instructional and administrative areas, where student learning or student study is taking place as each of these areas must be covered with Wi-Fi. Coverage must be sufficient so that every student, educator or administrator will be able to access the internet with all devices simultaneously. The coverage must be sufficient as usage grows with the addition of new media or devices. This includes access to the school environment via the wireless network and its services, including access to shared applications and files if approved by district and if the device is capable. The wireless solution shall provide complete mobility for devices. While at a school, the user(s) of device(s) must be able to experience transparent roaming connectivity to the wireless network throughout the school. If the device is brought to another school serving high school grades in the same district, then the device must seamlessly connect and stay connected while the user remains at the school. This requirement does not include the necessity to provide coverage for events such as sporting, assemblies or other all-inclusive events (i.e. the football stadium or auditoriums). The wireless solution will provide the ability for districts to view, and print statistics, and manage all access points and controllers from a single interface.

Wireless Bandwidth - The project shall provide an effective wireless solution with sufficient, measureable and necessary bandwidth. The solution must not only include sufficient and measureable aggregate bandwidth but must also be capable of being customized for varying needs within a school. For example, a concentration of physical classrooms within a school may require additional access points, faster speeds or both within that area.

Internet Access - Access to the Internet for Idaho schools is to be provided via each school's connection to the IEN or other ISP (Note: the vast majority of schools are connected via IEN). The District will ensure its solution integrates with the school's connection, IEN or other, and the District will work with each school and the IEN, or other ISP if the IEN is not currently providing bandwidth, to identify bandwidth and network infrastructure.

Content Filtering and Logging - Internet content filtering, as required by the Children's Internet Protection Act (CIPA), must be included as part of the solution. The filtering solution must be configurable in order to account for differing local district policies on acceptable Internet content and age appropriateness. Content filtering is an integral component of the wireless service, and as such, must include:

- The ability for each district to manage its own filtering policies, including the decision to block specific categories of content and to maintain its own whitelist and blacklist overrides.

- The ability to provide per district utilization and filtering reports, including top websites visited, top categories visited, top websites blocked, top search terms, and top authenticated users.

- The ability to audit all changes to content filtering policies.

The district must have reporting and management capabilities for content filtering and logging. They must be able to produce reports, if requested for audit purposes to the SDE Content filtering and logging reports must be in compliance with e-rate funding criteria.

Existing School Networks – The solution will integrate wireless access to the school's existing network.

The project must include all cabling for its solution and the connection to the school's local network and the Idaho Education Network (IEN) and/or the local ISP.

Growth - Suitable architecture must be provided to allow for growth in the wireless network infrastructure if additional grades in the school begin to utilize the infrastructure or the population of the school utilizing the infrastructure grows. The solution must provide for growth in the number of devices per user as well as the number of users.

Performance and Quality - In order to provide high quality 802.11a/b/g/n/ac (and 802.11 ad when ratified by IEEE and readily available to work with systems within the school/building/site) wireless access that will work with multiple devices of different wireless sensitivity, including laptops and tablets of different manufacture, the wireless solution must provide RF signal strength of at least -70dBm or better as measured in the 2.4 Ghz spectrum in all locations where wireless service is to be provided. Signal strength will be measured by an industry-standard Wi-Fi measurement tool, such as the Fluke AirCheck or similar device.

The solution must provide a minimum -70dBm signal strength in all areas where service is to be provided. The solution must allow a multitude of different wireless devices for students and educators to roam with transparent connectivity from different areas of the school or building without losing connectivity and without needing to re-authenticate to different wireless access points. Furthermore, minimum wireless signal strength of -70 dBm will allow almost all modern wireless devices to negotiate a connection with sufficient bandwidth to stream video, participate in Web 2.0 interactive applications and generally have an excellent online educational experience, given that the site has sufficient Internet access.

The district/schools wireless network performance will be tested using an endpoint device that meets the following minimum requirements:

- Windows 7 Professional, SP1

- 2GB RAM

- Wireless N or AC Network Card based on installed equipment

- 250GB HDD

These minimums are established using the metrics defined in **Attachment 1**.

Uptime - The solution must ensure that all functions of its solution are reliable and available to the schools, educators and students. Uptime shall be as follows:

PERIOD OF PRIME USAGE	UPTIME PERCENTAGE
7:00 AM 5:00 PM, Local Site Time, Monday-Friday, excluding holidays	99%
All other times	95%

Uptime shall be measured from 12:01 am to 11:59 pm. in a calendar day.

Response Time The solution must provide services to all students and educators concurrently on the wireless network with quality response time that does not hinder or impede effective instruction and learning in the classroom. This requirement also includes quality of service with the ability for students to browse the Internet, download files and use streaming video without unreasonable delay**.**

Business Continuity/Disaster Recovery - The wireless solution must include a disaster recovery/business continuity plan to cover replacement of the provided hardware and other solution elements in the event of theft or loss. The plan must address how the infrastructure/wireless solution will be restored by the start of next school day at 7 AM, local time. The plan should also address how the network will be restored in the situation of a catastrophic event and the anticipated time for the restoration.

Power Utilization - The solution should include sufficient Uninterruptible Power Supply (UPS) capacity to those parts of the solution where a power loss could cause data loss or corruption, instability or other long-term negative effects on the solution. The solution will be able to be fully-enabled upon restoration of power without reconfiguration or significant intervention. Therefore, necessary included servers and key infrastructure hardware such as switches and wireless access points should have a UPS with capacity to allow for the hardware to remain operative in the case of a power outage. If a UPS is utilized it should allow personnel enough time to satisfactorily shut down the server(s) or the infrastructure hardware provided.

Performance Metrics and Reporting - The solution must include the capability to track and record operational Performance and Quality metrics. Such performance metrics will be reported quarterly, by school as necessary, to the SDE Program Manager. The Districts will provide reporting that includes such items as incidents, device and system failure, available connections metrics, connection failures rates, types, downtime, repair

turnaround times, trends, remediation needed, unresolved issues, recommended improvements and other factors necessary to ensure a successful project. Reporting should also include information that is required to enforce compliance to standards.

Wireless Security - The solution must protect against eavesdropping and unauthorized access. The solution may include encryption or other techniques to provide this assurance.

Authorization Control – The wireless solution must allow access to authorized users only. The solution must work in conjunction with the district's network security policies allowing access strictly to those resources, files, applications, and services that they are authorized to use. Security will be definable by the district, both at an individual user basis and/or by class of users (educators, students, parents, administrators, etc.). Identification of a user must be unique to each individual.

Backups - In order to protect the solution from data loss, corruption or hardware failure, backup and recovery capabilities are required to permit regular, periodic backup of the administrative and configuration data, logging information and filtering, and user files, and to restore all of the above on demand. The ability to perform automatic scheduling of backup functions is desired. This should include automatic backup from the Hardware to a server or some other facility on at least a daily basis to prevent data loss where data shall never be deleted except by the owner/administrator. The back-up should provide for archiving of the various logs, usage, etc. for at least one school year.

Validation Testing - The solution will be subject to validation testing and must be conducted, in conjunction with the SDE, to confirm the solution meets or exceeds the functional requirements and the performance and reliability specifications as required herein. This Validation Test will provide the opportunity to test its equipment in Idaho school environments and will assure the SDE that the solution is acceptable upon complete deployment within the school or building. The testing will include connectivity, usability and reliability during the first year. The SDE reserves the right to require additional testing. Tests performed by the SDE will distinguish between the wireless solution's operation and performance on the actual internet connection and the WAN links where applicable.

Installation Standards - All cabling, wiring, connectors and mounts will be installed in a manner which meets industry safety and security requirements and guidelines. No hazards will be created; any identified hazard will be identified in writing to appropriate site or the SDE. Installations must be performed in a manner that does not harm or diminish local site designs or terminate building cable warranties, other building warranties, structural integrity or, to the extent feasible, cosmetics. Installations will meet all prevailing local codes and governing body codes as well as IEEE, TIA/EIA and ISO/IEC standards for cabling and wiring.

- **IEEE** - Institute of Electrical and Electronic Engineers

- **TIA/EIA** - Telecommunications Industry Association/Electronic Industry Association

- **ISO/IEC** - International Organization for Standardization/Equipment Installer's Code

ATTACHMENT 1

Specification Summary Worksheet

NAME OFSCHOOL: _____

Instructions: Complete this worksheet for the network connectivity and WLAN. Fill in each blank with the requested information. You must attach additional pages to provide complete information where required.

Network Connectivity

Wireless Type_____
       Speed_____

Wireless Local Area Network (WLAN)

Manufacturer _____

Wireless Transmission Rate of   _____ Mbps/sec at a range of 50 feet

                                       _____ Mbps/sec at a range of 100 feet

                                       _____ Mbps/sec at a range of 200 feet

         Maximum Range of _____ feet

Full disclosure of the capabilities and limitations of the wireless technology must be included such as interference between classrooms, distance and object penetration data, and susceptibility to interference from outside sources.

Describe the actual throughput for the installed wireless network (Kb/sec, Mb/sec, Gb/sec) for a 1Mb file, 1 Mb Streaming Audio File, and 1 Mb Streaming Video File for the highest potential number of simultaneous users at the specific site:

ATTACHMENT 2

Definitions

The following terms and abbreviations are defined as used herein.

SDE	Idaho State Department of Education
Encryption	The process of encoding messages or information in such a way that only authorized parties can read it. Examples include but not limited to WPA, WEP, WPA2, 802.1X
Department	Idaho State Department of Education
High School	Any State funded educational agency serving grades 9 – 12
IEN	Idaho Education Network
ISP	Internet Service Provider
LAN	Local Area Network
WAN	Wide Area Network
WLAN	Wireless Local Area Network
State	SDE
AES	Advanced Encryption Standard
WPA	Wi-Fi Protected Access
WPA2	Wi-Fi Protected Access requiring Testing and certification by the Wi-Fi Alliance, implementing mandatory elements of IEEE 802.11i and introduces CCMP a new AES based encryption mode with strong security.
WEP	Wired Equivalent Privacy

ATTACHMENT 3

BASIC TECHNICAL REQUIREMENTS EASY REFERENCE SHEET

- **Wireless Coverage**
  - Provide 802.11X coverage at a minimum a/b/g/n (and ac/ad when available to work with systems within the school/building/site). We expect the newest ratified standards to be utilized at the time of hardware purchase with periodic upgrades to the most current standards on a rotational basis once every 60 months or sooner as deemed necessary. The district's will have up to 24 months from April 1, 2014 to purchase and install 802.11n equipment based on the individual districts' needs and requirements;
  - Provide both 2.4Ghz and 5Ghz wireless service;
  - Provide a minimum of -70dbm as measured on the 2.4Ghz spectrum to all areas where service is required, per the specifications listed above;
  - Provide load balancing/ band steering (band steering to automatically serve both 5Ghz capable clients and maximizing the capacity in the 2.4Ghz range) to ensure optimal distribution both up and down of clients on the 2.4Ghz and 5Ghz spectrum;
  - Provide cabling that is rated no lower than cat 5e (preferred cat 6) to allow copper connectivity at 1000Mb or 1Gb;
  - Patch panel will match the district's network cable specification or better;
  - The copper cable will not run a distance longer than 100 Meters to be within the IEEE Specification for copper Ethernet.
  - The access point will be labeled and matching label will be placed on the patch panel for identification. A patch cable will be placed from the patch panel to the network switch. Example if the cable is cat 5e the patch panel will be cat 5e or better if the cable is cat 6 the patch panel will be cat 6 or better;
  - Provide multiple user profiles and access levels within a single wireless SSID, as such topologies will be required by certain schools;
  - At a minimum, provide quarterly per district and per school wireless utilization reporting to the SDE, including total connected users, users per spectrum, and users per SSID;
  - Provide a graphical layout of signal strength to the SDE throughout the network at each school.

- **Access** - Districts must define all areas at each site that are designated as instructional and administrative areas, where student learning or student study is taking place as each of these areas must be covered with Wi-Fi. Coverage must be sufficient so that every student, educator or administrator will be able to access the internet with all devices simultaneously.

- **Bandwidth** - The solution must not only include sufficient and measureable aggregate bandwidth but must also be capable of being customized for varying needs within a school.

- **Internet Access** - The District will ensure its solution integrates with the school's connection, IEN or other ISP, and the District will work with each school and the IEN, or other ISP if the IEN is not currently providing bandwidth, to identify bandwidth and network infrastructure.

- **Content Filtering and Logging**
  - Content Filtering must include: The ability for each district to manage its own filtering policies, including the decision to block specific categories of content and to maintain its own whitelist and blacklist overrides.
  - The ability to provide per district utilization and filtering reports, including top websites visited, top categories visited, top websites blocked, top search terms, and top authenticated users.
  - The ability to audit all changes to content filtering policies
  - The ability to produce reports, if requested, for audit purposes to the SDE Content filtering and logging reports must be in compliance with e-rate funding criteria.

- **Cabling** - The project must include all cabling for its solution and the connection to the school's local network and the Idaho Education Network (IEN) and/or the local ISP

- **Performance** - The wireless solution must provide RF signal strength of at least -70dBm or better as measured in the 2.4 Ghz spectrum in all locations where wireless service is to be provided in order to provide high quality 802.11a/b/g/n/ac (and 802.11 ad when ratified by IEEE and readily available to work with systems within the school/building/site) wireless access that will work with multiple devices of different wireless sensitivity.

- **Roaming** - The solution must allow a multitude of different wireless devices for students and educators to roam with transparent connectivity from different areas of the school or building without losing connectivity and without needing to re-authenticate to different wireless access points.

- **Performance Testing** - Wireless network performance will be tested using an endpoint device that meets the following minimum requirements:
  - Windows 7 Professional, SP1
  - 2GB RAM
  - Wireless N or AC Network Card based on installed equipment
  - 250GB HDD

- **Uptime -** The solution must ensure that all functions of its solution are reliable and available to the schools, educators and students. Uptime shall be as follows:

1.1.1 PERIOD OF PRIME USAGE	UPTIME PERCENT AGE
7:00 AM 5:00 PM, Local Site Time, Monday-Friday, excluding holidays	99%
All other times	95%

- o Uptime shall be measured from 12:01 am to 11:59 pm. in a calendar day.

- **Response Time** The solution must provide services to all students and educators concurrently on the wireless network with quality response time that does not hinder or impede effective instruction and learning in the classroom.

- **Business Continuity/Disaster Recovery -** The wireless solution must include a disaster recovery/business continuity plan that addresses how the infrastructure/wireless solution will be restored by the start of next school day at 7 AM, local time.

- **Power Utilization -** The solution should include sufficient Uninterruptible Power Supply (UPS) capacity to those parts of the solution where a power loss could cause data loss or corruption, instability or other long-term negative effects on the solution.

- **Performance Metrics and Reporting -** The solution must include the capability to track and record operational Performance and Quality metrics quarterly, by school as necessary, to the SDE Program Manager.

- **Wireless Security -** The solution must protect against eavesdropping and unauthorized access. The solution may include encryption or other techniques to provide this assurance.

- **Authorization Control –** The wireless solution must allow access to authorized users only. The solution must work in conjunction with the district's network security policies allowing access strictly to those resources, files, applications, and services that they are authorized to use, definable by the district.

- **Backups** - backup and recovery capabilities are required to permit regular, periodic backup of the administrative and configuration data, logging information and filtering, and user files, and to restore all of the above on demand, and preferably automatic updates as well including daily backups to prevent data loss.

- **Validation Testing -** The solution will be subject to validation testing and must be conducted, in conjunction with the SDE, to confirm the solution meets or exceeds the functional requirements and the performance and reliability specifications as required herein.

- **Installation Standards** - Installations must be performed in a manner that does not harm or diminish local site designs or terminate building cable warranties, other building warranties, and structural integrity or, to the extent feasible, cosmetics. Installations will meet all prevailing local codes and governing body codes as well as IEEE, TIA/EIA and ISO/IEC standards for cabling and wiring.

For complete requirements, please refer to the entire document.